DOCUMENT RESUME

ED 381 384 SE 056 177

AUTHOR Regets, Mark C.
TITLE Nonacademic Scientists and Engineers: Trends from the 1980 and 1990 Censuses.
INSTITUTION National Science Foundation, Arlington, VA. Div. of Science Resources Studies.
REPORT NO NSF-95-306
PUB DATE 95
NOTE 19p.
AVAILABLE FROM Division of Science Resources Studies, National Science Foundation, Arlington, VA 22230 (free). Internet users: pubs@nsf-gov.; include NSF publication number and title, your name, and complete mailing address.
PUB TYPE Reports - Descriptive (141) -- Statistical Data (110)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Employment; *Employment Patterns; *Engineers; *Experimenter Characteristics; Occupations; *Population Trends; Regional Characteristics; *Researchers; *Scientists; Tables (Data)
IDENTIFIERS *Nonacademic Personnel

ABSTRACT

This report presents a broad picture of the characteristics of scientists and engineers (S&Es) outside academia and how these characteristics changed between 1980 and 1990. Data for this report come primarily from National Science Foundation tabulations of 1980 and 1990 Public Use Microdata Samples of the decennial census. Around one-third of those with science and engineering occupations on the 1980 and 1990 censuses appear to have less than a bachelor's degree. Other data sources typically use a minimum of a bachelor's degree in defining S&Es. Table 1 presents general characteristics including age, education, employment, race, nationality, and gender. Table 2 shows occupation for nonacademic S&Es. Table 3 contains employment by region and state. Table 4 presents median earnings. Table 5 lists numbers of women and minorities by occupation. Table 6 shows the proportion of foreign-born S&Es. A highlights section analyzes trends represented by the data. (LZ)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 381 384

SE

Nonacademic Scientists and Engineers: Trends From the 1980 and 1990 Censuses

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

- This document has been reproduced as received from the person or organization originating it.
- ☐ Minor changes have been made to improve reproduction quality.

- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Division of Science Resources Studies
Directorate for Social, Behavioral and Economic Sciences

National Science Foundation

NSF 95-306

BEST COPY AVAILABLE

Nonacademic Scientists and Engineers: Trends From the 1980 and 1990 Censuses

Mark C. Regets, Project Officer

Division of Science Resources Studies
Directorate for Social, Behavioral and Economic Sciences

National Science Foundation

NSF 95-306

Suggested Citation

National Science Foundation, *Nonacademic Scientists and Engineers: Trends From the 1980 and 1990 Censuses,* NSF 95-306 (Arlington, VA, 1995).

Availability of Publications

Single copies are available free of charge from the Division of Science Resources Studies, National Science Foundation, Arlington, VA 22230. If you are a user of electronic mail and have access to Internet, you may order publications electronically. Internet users should send requests to pubs@nsf.gov. In your request, include the NSF publication number and title, your name, and a complete mailing address. Printed publications may also be ordered by fax (703-644-4278). Publications should be received within 3 weeks after receipt of request. See page iv for availability on the Science and Technology Information System (STIS).

Telephonic Device for the Deaf

(703) 306-0090

CONTENTS

Section *Page*

Data Issues 1
Highlights 3
Table 1: General Characteristics 3
Table 2: By Occupation 3
Table 3: By Region and State 3
Table 4: Median Earnings 3
Table 5: Ethnic Minorities and Women 3
Table 6: Immigrant Scientists and Engineers 3

List of Tables

1. General characteristics of nonacademic scientists and engineers: 1980 and 1990 5

2. Nonacademic scientists and engineers, by census occupation: 1980 and 1990 7

3. Nonacademic scientists and engineers, by State: 1980 and 1990 9

4. Nonacademic scientists and engineers, median earnings: 1979 and 1989 11

5. Nonacademic scientists and engineers, by sex and ethnic minority: 1980 and 1990 13

6. Immigrant nonacademic scientists and engineers: percent of total, by educational level and age group: 1980 and 1990 15

STIS

The Science & Technology Information System (STIS) at the National Science Foundation

What is STIS?

STIS is an electronic dissemination system that provides fast, easy access to National Science Foundation (NSF) publications. There is no cost to you except for possible long-distance phone charges. The service is available 24 hours a day, except for brief weekly maintenance periods.

What Publications are Available?

Publications currently available include:

- The *NSF Bulletin*
- Program announcements and "Dear Colleague" letters
- General publications and reports
- Press releases, Other NSF news items
- NSF organizational and alphabetical phone directories
- NSF vacancy announcements
- Award abstracts (1989-now)

Our goal is for all printed publications to be available electronically.

Access Methods

There are many ways to access STIS. Choose the method that meets your needs and the communication facilities you have available.

Electronic Documents Via E-Mail. If you have access to Internet e-mail, you can send a specially formatted message, and the document you request will be automatically returned to you via e-mail.

Anonymous FTP. Internet users who are familiar with this file transfer method can quickly and easily transfer STIS documents to their local system for browsing and printing.

On-Line STIS. If you have a VT100 emulator and an Internet connection or a modem, you can log on to the on-line system. The on-line system features full-text search and retrieval software to help you locate the documents and award abstracts that are of interest to you. Once you locate a document, you can browse through it on-line or download it using the Kermit protocol or request that it be mailed to you.

Direct E-Mail. You can request that STIS keep you informed, via e-mail, of all new documents on STIS. You can elect to get either a summary or the full text of new documents.

Internet Gopher and WAIS. If your campus has access to these Internet information resources, you can use your local client software to search and download NSF publications. If you have the capability, it is the easiest way to access STIS.

Getting Started with Documents Via E-Mail

Send a message to the Internet address **stisserv@nsf.gov**. The *text* of the message should be as follows (the Subject line is ignored):

get index

You will receive a list of all the documents on STIS and instructions for retrieving them. Please note that all requests for electronic documents should be sent to **stisserv**, as shown above. Requests for printed publications should be sent to **pubs@nsf.gov.**

Getting Started with Anonymous FTP

FTP to *stis.nsf.gov*. Enter *anonymous* for the username, and your E-mail address for the password. Retrieve the file "index". This contains a list of the files available on STIS and additional instructions.

Getting Started with The On-Line System

If you are on the Internet: *telnet stis.nsf.gov*. At the login prompt, enter *public*.

If you are dialing in with a modem: Choose 1200, 2400, or 9600 baud, 7-E-1. Dial (703) 306-0212 or (703) 306-0213

When connected, press *Enter*. At the login prompt, enter *public*.

Getting Started with Direct E-Mail

Send an E-mail message to the Internet address **stisserv@nsf.gov**. Put the following in the text:

get stisdirm

You will receive instructions for this service.

Getting Started with Gopher and WAIS

The NSF Gopher server is on port 70 of **stis.nsf.gov.** The WAIS server is also on **stis.nsf.gov.** You can get the ".src" file from the "Directory of Servers" at **quake.think.com.** For further information contact your local computer support organization.

For Additional Assistance Contact:

E-mail: *stis@nsf.gov* (Internet)

Phone: (703) 306-0214 (voice mail)

TDD: (703) 306-0090

NSF 94-4
(Replaces NSF 91-10)

NSF Division of Science Resources Studies

NSF 95-306

Order Form

Please send me the following reports:

Title	NSF No.	
Characteristics of Doctoral Scientists and Engineers in the United States: 1991, Detailed Statistical Tables	94-307	☐
Data Brief, "Changes in the Immigration Law of 1990 Stimulate Major Increases in Immigrant Scientists and Engineers"	94-310	☐

Check here to get SRS *Publications List: FY1989-93.* ☐

Name	
Address	
City	
State	Zip
Phone	Fax

To order SRS publications, fill out order form, cut on dotted line, fold in half, tape, and drop in the mail. No postage is necessary. Form can also be sent in via fax, at 703-306-0510.

NATIONAL SCIENCE FOUNDATION
ARLINGTON, VA 22230

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE $300

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 12806 ARLINGTON, VA

National Science Foundation
Division of Science Resources Studies
Publications Unit
4201 Wilson Blvd., Suite 965
Arlington, VA 22203-9966

Fold here

Please tape here (do not staple)

DATA ISSUES

This report presents a broad picture of the characteristics of scientists and engineers (S&Es) outside academia and how these characteristics changed between 1980 and 1990.

Data for this report come primarily from National Science Foundation (NSF) tabulations of 1980 and 1990 Public Use Microdata Samples (PUMS) of the decennial census provided by the U.S. Bureau of the Census. Specifically, data for S&Es in 1980 and their wage and salary income in 1979 comes from the 1980 5-percent PUMS. Data for S&Es in 1990 and their wage and salary income in 1989 comes from a reweighted combined file of the 1990 1-percent and 5-percent PUMS. Data for wage and salary income for all workers come from the 1980 and 1990 1-percent PUMS. Decennial Census occupation codes were used to identify S&Es. All postsecondary teachers and individuals whose industry was identified as "colleges and universities" were excluded to maintain a focus on nonacademic S&Es. Technicians and technologist occupations, though closely related to science and engineering, were also excluded.

The counts of S&Es in this report do not agree with other NSF reports and data on S&Es for a number of reasons. First, many NSF reports are based upon field of degree rather than occupation. On decennial census data, S&Es can only be identified through an occupation variable coded primarily through a write-in occupation question on the decennial long form. These variations in defining S&E result in obvious differences—the number of individuals with a Ph.D. in biology will be different from the number of individuals with Ph.D.'s whose occupation is biologist. Second, the decennial censuses may classify the occupation of many S&Es in ways that prevent their identification as S&Es. For example, "post-secondary teacher, subject not specified," "authors," "technical writers," various types of managers, and various types of technicians are all examples of occupation categories which may contain unidentified scientists and engineers. It is largely for this reason that this report makes no attempt to examine changes in the characteristics of academic S&Es. In NSF's own demographic surveys—the Survey of Doctoral Recipients, the National Survey of College Graduates, and the National Survey of Recent College Graduates—special care is taken to reduce these problems in identifying those whose occupations are in science or engineering.

Around one-third of those with science and engineering occupations on the 1980 and 1990 censuses appear to have less than a bachelor's degree. Other data sources typically use a minimum of a bachelor's degree in defining S&Es. Thus it is important to consider education level in most analytic uses of this data.

Comparisons between the 1980 and 1990 Census that use education level are problematic due to differences in how education was measured in the two censuses. In 1980, census long-form recipients were asked about the number of years of education they had completed. In 1990, the education question was changed to ask about degree completion rather than years in school. However, it is possible to measure how close a comparison can be made between the two measures, because a group of the same individuals answered the two different versions of the education question on the 1991 and 1992 Current Population Survey (CPS).

A tabulation of a match between the 1991 and 1992 CPS provided by David A. Jaeger of the Department of Economics and Population Studies Center of the University of Michigan[1] indicates that of individuals with 16 or more years of completed education measured by the 1980 education question, only 6.9 percent did not indicate a bachelor's degree or higher in their response to the 1990 question. By the same measures, 1.8 percent of those with less than 16 years do have a bachelor's degree. Overall, using 16 years or more of education as a measure overestimates the total number of bachelor's degrees by 1.2 percent. This report uses "bachelor's or higher" as an additional breakdown of 1980/1990 differences in characteristics but does not attempt finer comparisons by education where there is more disagreement between the 1980 and 1990 education measures. Accordingly, great care should be used in interpreting 1980/1990 changes reported by education.

---

[1] David J. Jaeger, *Reconciling the Old and New Census Bureau Education Questions: A Recommendation for Researchers*, Working Paper (Ann Arbor: University of Michigan Population Studies Center, June 1984).

Earnings from wages and salaries are reported on each decennial census for the previous year; i.e., 1979 and 1989. In this report 1979 earnings are reported in 1989 dollars using the implicit price deflator for personal consumption expenditures. In calculating median earnings for this report, those with zero earnings were excluded.

HIGHLIGHTS

TABLE 1: GENERAL CHARACTERISTICS

Between 1980 and 1990 the population of nonacademic scientists and engineers became older; more educated; more likely to be attending school; more likely to be self-employed; more black, Hispanic, and Asian; more foreign born; more likely to report a disability; and much more female. The proportion of female S&Es increased from 12.6 to 22.2 percent from 1980 to 1990. Over three-quarters of nonacademic S&Es work in the private sector for a for-profit or nonprofit company. However, this share drops to 57.3 percent at the Ph.D. level, where 24.7 percent work for government and 18.1 percent are in some form of self-employment. The median education level is a bachelor's degree, with 30.0 percent of nonacademic S&Es in 1990 having less than a bachelor's and only 5.3 percent with a doctorate.

TABLE 2: BY OCCUPATION

Overall the number of nonacademic S&Es increased by 64.4 percent, with a larger 74.0-percent increase in the number with a bachelor's degree or higher. Computer systems analysts and scientists; physical scientists not elsewhere classified, n.e.c.; psychologists; and social scientists, (n.e.c.), all more than doubled in number. The number of "operations and systems researchers and analysts" more than tripled—increasing by 250.2 percent. There were decreases in the number of metallurgical and materials engineers; mining engineers; agricultural engineers; mathematical scientists, n.e.c.; and sociologists.

TABLE 3: BY REGION AND STATE

All geographic regions and all but one State showed increases in the number of S&Es. The slowest growth in the number of S&Es, 41.1 percent, was in the East North Central region. The fastest growth occurred in the South Atlantic region—98.1 percent.

TABLE 4: MEDIAN EARNINGS

Median real earnings remained essentially stable for all major occupation groups. Earnings growth ranged from a 7.9-percent decline for social scientists to a 0.5-percent increase for engineers. Over this 10-year period there was a 1.3-percent decline in real median earnings for S&Es. This decline in earnings occurred despite the small increases in both age and education of the S&E population, and S&Es with bachelor's degrees or higher actually experienced a slightly greater decline. Younger S&Es (those under age 40) fared better than older S&Es in each occupation group. For those with a bachelor's degree or higher, the median earnings of younger S&Es increased by 1.2 percent, whereas median earnings declined by 5.1 percent for older S&Es.

Despite this decline, S&Es continue to earn more than the national median for workers in all occupations. This is true even at the Ph.D. level, where the 1989 median salary for S&Es was $50,000, versus $43,000 for all Ph.D.'s.

TABLE 5: ETHNIC MINORITIES AND WOMEN

Although representation of women and minorities varies greatly among occupations, every occupational group showed increases between 1980 and 1990 in the proportions of blacks, Hispanics, Asians, and women. Over all nonacademic S&E occupations and education levels, the proportion of blacks increased from 3.2 to 4.4 percent; Hispanics, from 2.2 to 3.1 percent; Asians, from 4.2 to 6.0 percent; and women, from 12.6 to 22.2 percent.

TABLE 6: IMMIGRANT SCIENTISTS AND ENGINEERS

Overall, the proportion of foreign-born S&Es increased from 9.1 to 11.0 percent between 1980 and 1990, with increases occurring in all S&E occupational groups except social science. The importance of foreign-born S&Es to the total numbers of nonacademic S&Es increases with education level, rising to 22.6 percent of Ph.D.s in 1990. Both the greatest proportion and the greatest increase in the proportion of foreign-born S&Es occur for 45- to 54-year-olds, whose proportion increased from 8.5 to 15.5 percent. Among Ph.D.s, engineers had the greatest proportion of foreign born at 39.2 percent.

Table 1. General characteristics of nonacademic scientists and engineers: 1980 and 1990

[Percentages]

Category	All education levels		Bachelor's or higher (16 years or higher in 1980)		Doctorate
	1980	1990	1980	1990	1990
RACE/ETHNICITY					
Black	3.2	4.4	2.6	3.6	2.0
Hispanic	2.2	3.1	2.0	2.8	2.3
Asian	4.2	6.0	5.7	7.5	11.4
Non-Hispanic white	90.0	86.1	89.5	85.8	84.0
SEX					
Women	12.6	22.2	11.6	21.7	22.5
Men	87.4	77.8	88.4	78.3	77.5
CITIZENSHIP AND NATIVITY					
Foreign born:					
Total	9.1	11.0	11.2	13.1	22.6
Noncitizen	3.8	4.6	4.8	5.5	10.4
Native born	90.9	89.0	88.8	86.9	77.4
Disabled [1]	3.3	3.9	2.8	3.0	3.0
EMPLOYMENT SECTOR					
Self employed:					
Unincorporated	2.8	4.4	3.2	4.9	14.0
Incorporated	1.2	1.7	1.4	1.9	4.1
For-profit company	76.7	71.0	73.9	69.0	44.8
Nonprofit company	([2])	4.5	([2])	5.1	12.5
Federal	10.3	10.2	11.9	10.5	13.9
Other government	9.0	8.2	9.5	8.6	10.8
EDUCATION					
High school or less	13.3	7.4	([3])	([3])	([3])
Some college/associate's degree	20.6	22.6	([3])	([3])	([3])
Bachelor's	44.3	44.8	([3])	([3])	([3])
Master's	([4])	18.8	([3])	([3])	([3])
Professional degree	([4])	1.0	([3])	([3])	([3])
Doctorate	([4])	5.3	([3])	([3])	([3])
AGE					
Less than 30	25.3	22.6	26.2	23.7	3.7
30-39	32.5	32.6	34.4	34.2	30.6
40-49	20.7	22.4	19.5	21.9	37.5
50-64	20.2	17.5	18.7	15.9	22.7
65 and over	1.3	4.9	1.3	4.4	5.5
Attending school	10.2	12.2	8.0	11.3	5.2

[1] Person identified self as having a health condition that has lasted for 6 or more months and that limits the kind or amount of work he or she can perform.

[2] In 1980 nonprofit companies were collapsed in with "For-profit" companies.

[3] Meaningful only when applied to "All Education Levels"

[4] 1980 census asked only for total number of years of education; 1990 census asked about degree completed, not years in school. The percent of those with greater than 16 years of education for 1980 is 21.8.

SOURCE: NSF/SRS, tabulations from 1980 and 1990 Census Public Use Microdata Samples

Table 2. Nonacademic scientists and engineers, by census occupation: 1980 and 1990

Occupation	All education levels			Bachelor's or higher (16 years or higher in 1980)			Ph.D.
	1980	1990	Percent change	1980	1990	Percent change	1990
Engineers	1,353,200	1,894,400	40.0	853,000	1,294,900	51.8	38,100
Aerospace	85,200	159,600	87.2	60,400	120,500	99.6	4,300
Metallurgical and materials	23,700	20,000	-15.4	15,600	13,600	-12.9	800
Mining	10,200	7,200	-29.6	6,900	4,500	-33.7	0
Petroleum	22,600	28,000	23.8	17,200	22,700	32.2	1,000
Chemical	56,100	72,500	29.1	47,400	59,700	26.0	4,000
Nuclear	8,800	13,300	50.1	7,500	10,000	33.2	500
Civil	195,200	281,500	44.2	134,400	205,400	52.8	4,000
Agricultural	3,200	2,500	-23.0	2,200	1,700	-22.9	100
Electrical and electronic	315,200	511,800	62.4	197,500	354,100	79.3	8,900
Industrial	187,500	194,800	3.9	86,600	100,900	16.6	900
Mechanical	191,800	208,300	8.6	115,200	128,000	11.1	2,200
Marine and naval	14,200	17,500	23.4	5,800	8,900	54.1	200
Engineers n.e.c.	239,500	377,400	57.6	156,300	264,900	69.5	11,200
Life sciences	107,000	156,100	45.9	82,600	118,600	43.6	20,800
Agricultural and food scientists	19,900	35,800	80.1	13,000	21,100	62.7	3,800
Biological and life scientists	38,000	57,000	49.7	34,200	50,000	46.3	9,700
Forestry and conservation	30,900	39,200	26.8	20,700	23,700	14.3	700
Medical scientists	18,200	24,100	31.9	14,700	23,800	61.4	6,600
Math and computer scientists	305,600	797,700	161.0	176,900	494,700	179.6	17,100
Computer systems analysts and scientists	194,100	485,200	150.0	113,000	322,100	185.0	9,400
Operations and systems researchers and analysts	78,100	273,400	250.2	42,600	146,100	243.4	3,700
Statisticians	27,200	33,200	21.9	15,800	21,600	36.8	2,900
Mathematical scientists n.e.c.	6,200	5,900	-3.8	5,500	4,900	-10.0	1,100
Physical scientists	175,800	263,000	49.6	142,600	218,500	53.2	42,200
Physicists and astronomers	18,900	26,400	39.7	16,000	21,900	36.6	10,300
Chemists, except biochemists	96,600	147,700	52.8	76,100	119,800	57.5	23,800
Atmospheric and space scientists	7,900	10,800	36.6	4,800	6,400	34.8	800
Geologists and geodesists	43,900	58,500	33.4	38,800	53,500	37.9	5,500
Physical scientists n.e.c.	8,500	19,600	131.9	6,900	16,900	144.3	1,800
Social scientists	194,400	401,800	106.7	158,100	331,700	109.8	69,400
Economists	94,900	166,500	75.3	69,200	127,500	84.3	8,800
Psychologists	86,100	199,900	132.1	78,200	183,200	134.3	57,500
Sociologists	1,900	1,800	-4.4	1,500	1,500	4.0	200
Social scientists n.e.c.	11,500	33,600	193.4	9,200	19,500	112.9	2,900
TOTAL	2,136,200	3,512,800	64.4	1,413,000	2,458,600	74.0	187,500

NOTE: Numbers rounded to nearest hundred.

SOURCE: NSF/SRS, tabulations from 1980 and 1990 Census Public Use Microdata Samples

Table 3. Nonacademic scientists and engineers, by State: 1980 and 1990

Region	All education levels			Bachelor's or higher (16 years or higher in 1980)			Ph.D.'s (1990)
	1980	1990	Percent change	1980	1990	Percent change	
New England	157,000	266,000	69.4	103,900	190,800	83.5	14,600
Connecticut	48,300	71,000	47.1	32,100	50,100	56.1	3,200
Maine	6,900	12,400	80.6	4,000	7,800	96.6	300
Massachusetts	78,000	136,200	74.7	53,200	101,100	90.0	9,200
New Hampshire	11,700	24,800	111.5	7,000	16,700	136.7	800
Rhode Island	7,200	14,300	99.2	4,500	9,800	118.3	700
Vermont	5,000	7,300	47.1	3,200	5,300	67.8	400
Mid-Atlantic	360,700	535,500	48.4	247,100	386,700	56.5	34,000
New Jersey	95,100	147,000	54.5	69,100	111,000	60.5	10,300
New York	161,700	240,800	49.0	108,700	172,300	58.6	15,700
Pennsylvania	103,900	147,700	42.1	69,300	103,300	49.2	8,000
East North Central	371,400	524,200	41.1	226,400	343,400	51.7	21,600
Illinois	107,800	151,100	40.2	66,000	103,300	56.5	7,200
Indiana	42,200	60,300	43.0	24,100	37,500	55.8	2,100
Michigan	89,000	127,700	43.4	54,800	82,500	50.7	4,900
Ohio	99,800	132,600	32.9	62,200	87,300	40.4	5,800
Wisconsin	32,700	52,500	60.7	19,300	32,800	70.1	1,500
West North Central	124,100	192,600	55.1	79,300	129,600	63.4	7,400
Iowa	16,300	21,400	31.7	10,100	13,300	32.4	700
Kansas	20,200	29,800	47.5	12,900	19,600	51.3	1,000
Minnesota	35,700	62,400	74.9	22,700	43,100	89.5	2,600
Missouri	38,700	56,700	46.5	25,600	39,600	54.9	2,100
Nebraska	8,100	14,600	81.5	4,800	9,400	94.7	600
North Dakota	2,700	4,000	50.5	1,600	2,400	46.1	200
South Dakota	2,500	3,600	42.1	1,600	2,300	43.6	200
South Atlantic	311,200	616,600	98.1	207,500	428,100	106.4	36,600
Delaware	8,300	11,200	34.9	5,900	8,500	43.3	1,700
District of Columbia	10,200	14,300	39.4	7,700	11,500	49.2	2,300
Florida	63,600	141,800	122.9	38,400	92,800	141.5	4,900
Georgia	33,700	71,400	111.7	21,000	47,900	127.7	2,800
Maryland	70,200	124,500	77.2	51,300	93,700	82.7	11,400
North Carolina	31,800	70,400	121.8	20,200	45,400	125.0	3,500
South Carolina	18,000	35,300	95.7	10,200	22,800	123.9	1,100
Virginia	65,600	135,900	107.3	46,100	98,000	112.4	8,700
West Virginia	9,700	11,700	21.0	6,700	7,700	14.9	400
East South Central	87,600	136,600	55.9	56,100	90,900	62.0	5,500
Alabama	26,300	44,700	69.8	17,100	32,000	86.8	1,400
Kentucky	17,400	25,500	46.3	10,500	15,800	49.8	800
Mississippi	12,100	17,600	44.8	7,100	10,900	53.8	800
Tennessee	31,700	48,800	53.9	21,400	32,200	50.8	2,400

See SOURCE at end of table.

Table 3. Nonacademic scientists and engineers, by State: 1980 and 1990

Region	All education levels			Bachelor's or higher (16 years or higher in 1980)			Ph.D.'s (1990)
	1980	1990	Percent change	1980	1990	Percent change	
West South Central	203,800	325,100	59.5	144,900	234,100	61.6	13,300
Arkansas	8,900	13,500	52.3	5,400	8,200	52.1	400
Louisiana	28,600	37,600	31.4	20,600	26,800	29.9	1,600
Oklahoma	23,600	32,800	39.0	16,100	22,800	41.8	1,400
Texas	142,800	241,200	69.0	102,800	176,300	71.6	10,000
Mountain	121,600	212,800	75.0	84,400	152,200	80.3	13,100
Arizona	26,200	54,600	108.3	16,600	37,100	123.9	2,000
Colorado	44,100	74,200	68.1	31,900	55,100	72.7	4,600
Idaho	8,200	12,200	49.7	5,900	8,300	41.4	700
Montana	4,800	7,300	52.1	3,500	5,400	53.8	400
Nevada	5,800	12,700	116.9	3,600	8,400	131.5	600
New Mexico	14,500	23,600	62.9	10,700	18,500	72.5	3,800
Utah	13,000	23,900	84.0	8,500	16,100	89.2	1,000
Wyoming	5,000	4,400	-12.4	3,700	3,400	-10.2	200
Pacific	398,600	703,500	76.5	263,400	502,700	90.9	41,400
Alaska	4,800	9,700	102.5	3,300	7,100	112.9	400
California	311,600	549,400	76.3	204,200	395,400	93.6	34,300
Hawaii	6,500	12,900	98.2	4,800	8,500	75.9	700
Oregon	22,000	35,200	60.1	14,500	23,100	58.9	1,800
Washington	53,800	96,300	79.1	36,500	68,600	88.2	4,100
Total	2,136,200	3,512,800	64.4	1,413,000	2,458,600	74.0	187,500

NOTE: Numbers rounded to nearest hundred.

SOURCE: NSF/SRS, tabulations from 1980 and 1990 Census Public Use Microdata Samples

Table 4. Nonacademic scientists and engineers, median earnings: 1979 and 1989

[In 1989 dollars]

Occupation	All scientists and engineers			Bachelor's or higher (16 years or higher in 1980)			Ph.D.'s (1989)
	1979	1989	Percent change	1979	1989	Percent change	
Engineers	39,800	40,000	0.5	42,200	42,000	-0.6	58,000
Less than 40 years of age	34,900	36,000	3.2	37,200	38,000	2.2	51,000
40 years of age and older	45,600	46,000	0.9	50,700	50,000	-1.3	62,500
Life science	27,900	28,000	0.3	30,400	30,000	-1.3	42,000
Less than 40 years of age	23,700	24,000	1.2	26,000	25,800	-0.8	35,000
40 years of age and older	38,900	35,000	-9.9	42,200	37,800	-10.6	50,000
Math/computer science	35,500	35,600	0.3	37,400	38,000	1.7	52,000
Less than 40 years of age	33,700	33,000	-2.1	34,400	35,000	1.6	48,000
40 years of age and older	42,200	40,800	-3.4	47,300	45,200	-4.4	55,000
Physical science	35,400	34,400	-3.0	37,400	36,000	-3.9	52,000
Less than 40 years of age	30,100	30,000	-0.2	31,400	30,700	-2.1	45,000
40 years of age and older	46,600	43,000	-7.6	50,700	46,000	-9.2	59,600
Social science	30,400	28,000	-7.9	32,100	30,000	-6.5	40,000
Less than 40 years of age	27,000	24,000	-11.2	28,200	26,000	-7.7	36,000
40 years of age and older	40,900	35,000	-14.4	43,100	36,000	-16.4	43,000
All scientists and engineers	37,500	37,000	-1.3	40,500	39,500	-2.5	50,000
Less than 40 years of age	33,700	33,000	-2.1	34,600	35,000	1.2	42,000
40 years of age and older	44,800	43,800	-2.2	50,600	48,000	-5.1	54,000
All employed persons (including non-S&E)	15,200	16,000	5.2	22,000	28,000	27.5	43,000

NOTE: Numbers rounded to nearest hundred.

SOURCE: NSF/SRS, tabulations from 1980 and 1990 Census Public Use Microdata Samples

Table 5. Nonacademic scientists and engineers, by sex and ethnic minority: 1980 and 1990

[In Percentages]

Occupational groups	Black		Hispanic		Asian		Female	
	1980	1990	1980	1990	1980	1990	1980	1990
All education levels								
All S&E	3.2	4.4	2.2	3.1	4.2	6.0	12.6	22.2
Engineers	2.4	3.5	2.2	3.1	4.6	6.7	4.4	9.2
Life scientists	3.7	4.2	2.3	3.2	3.7	5.6	25.6	32.5
Math/computer scientists	5.4	6.4	2.3	3.1	3.5	6.2	25.9	36.2
Physical scientists	3.6	4.4	2.0	2.8	5.5	6.4	16.2	22.7
Social scientists	4.8	5.3	2.4	3.3	1.9	2.2	38.1	51.4
Bachelor's degree or higher (16 years+ in 1980)								
All S&E	2.6	3.6	2.0	2.8	5.7	7.5	11.6	21.7
Engineers	2.0	2.9	2.0	3.0	6.5	8.6	3.3	9.0
Life scientists	2.7	3.2	1.8	2.6	4.5	7.2	24.5	35.2
Math/computer scientists	4.7	5.2	1.9	2.4	5.0	8.5	22.8	32.1
Physical scientists	2.9	3.6	1.7	2.4	6.0	7.0	14.7	22.2
Social scientists	3.3	4.3	2.2	3.1	2.1	2.2	35.7	51.3
Doctorates								
All S&E	(1)	2.0	(1)	2.3	(1)	11.4	(1)	22.5
Engineers	(1)	1.2	(1)	1.6	(1)	23.8	(1)	4.9
Life scientists	(1)	2.2	(1)	1.8	(1)	13.2	(1)	24.6
Math/computer scientists	(1)	3.1	(1)	1.0	(1)	16.3	(1)	17.0
Physical scientists	(1)	1.3	(1)	1.9	(1)	12.7	(1)	11.0
Social scientists	(1)	2.5	(1)	3.5	(1)	2.2	(1)	39.9

1 1980 Census data contain years of education but not degree level.

SOURCE: NSF/SRS, tabulations from 1980 and 1990 Census Public Use Microdata Samples

Table 6. Immigrant nonacademic scientists and engineers: percent of total, by educational level and age group: 1980 and 1990

Occupational group	16-24 yrs of age	25-34 yrs of age	35-44 yrs of age	45-54 yrs of age	55-64 yrs of age	65 yrs of age and older	All ages
All education levels							
All science and engineering:							
1980	4.6	8.8	12.1	8.5	7.8	11.2	9.1
1990	9.0	12.5	14.3	15.5	11.4	10.7	11.0
Engineers:							
1980	5.1	10.2	13.2	8.6	7.7	11.4	9.9
1990	8.6	11.9	13.7	13.8	9.3	9.5	12.0
Life science:							
1980	2.5	4.9	12.0	9.1	9.7	13.4	7.4
1990	5.8	10.9	9.9	12.2	11.8	8.3	10.3
Math/computer science:							
1980	5.3	7.0	7.6	5.3	6.4	6.5	6.8
1990	10.4	11.1	10.7	8.0	6.7	6.6	10.1
Physical science:							
1980	3.1	9.5	16.8	11.8	8.6	10.7	10.9
1990	5.9	10.6	13.4	18.9	12.0	11.3	12.6
Social science:							
1980	2.8	5.8	9.2	8.6	8.9	11.8	7.2
1990	5.6	6.9	6.6	8.0	8.8	9.9	7.2
Bachelor's degree or higher							
All science and engineering:							
1980	4.8	10.2	15.6	10.8	9.7	12.7	11.2
1990	9.0	12.5	14.3	15.5	11.4	10.7	13.1
Engineers							
1980	5.4	12.4	18.0	11.1	9.5	12.2	12.5
1990	9.6	13.5	17.6	18.5	11.6	10.8	14.7
Life science							
1980	3.2	5.4	13.6	10.4	11.0	20.0	8.6
1990	7.1	12.1	11.1	13.9	15.3	9.4	11.9
Math/computer science							
1980	5.2	8.2	10.2	7.6	10.5	11.4	8.6
1990	10.7	12.9	13.8	10.6	8.5	7.7	12.4
Physical science							
1980	3.6	10.1	18.7	12.5	9.6	11.6	12.1
1990	5.1	11.3	14.5	21.7	13.7	12.1	13.9
Social science							
1980	2.3	5.7	9.5	10.0	9.9	13.0	7.5
1990	6.3	7.3	6.7	8.3	9.2	11.6	7.5
Ph.D. (1990 only)[1]							
All science and engineering	([2])	25.9	22.5	22.3	20.3	19.5	22.6
Engineers	([2])	40.5	47.9	35.9	29.1	29.4	39.2
Life science	([2])	29.0	22.3	25.0	28.5	14.3	24.5
Math/computer science	([2])	44.5	29.4	24.9	25.3	21.6	29.2
Physical science	([2])	24.8	25.3	26.2	22.9	21.1	24.8
Social science	([2])	9.6	9.0	10.4	9.6	14.0	9.8

[1] 1980 Census data contain years of education but not degree level.

[2] Total Ph.D.'s under 25 years of age is too small to allow reliable estimates of the percentages foreign born.

SOURCE: NSF/SRS, tabulations from 1980 and 1990 Census Public Use Microdata Samples

NATIONAL SCIENCE FOUNDATION
ARLINGTON, VA 22230

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

RETURN THIS COVER SHEET TO ROOM P35 IF YOU DO NOT WISH TO RECEIVE THIS MATERIAL ☐ , OR IF CHANGE OF ADDRESS IS NEEDED ☐ , INDICATE CHANGE INCLUDING ZIP CODE ON THE LABEL (DO NOT REMOVE LABEL).

00145173 ERIC
ERIC FACILITY
1301 PICCARD DRIVE
SUITE 300
ROCKVILLE MD 20850-4305

BULK RATE
POSTAGE & FEES PAID
National Science Foundation
Permit No. G-69

Nonacademic Scientists and Engineers: Trends From the 1980 and 1990 Censuses

NSF 95-306